

**POLYCHLORINATED BIPHENYL (PCB) INVESTIGATION
SUMMARY REPORT**

**JOHN C. CLARK ELEMENTARY SCHOOL
75 CLARK STREET
HARTFORD, CT**

PREPARED FOR:

**HARTFORD PUBLIC SCHOOLS
960 MAIN STREET
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INTRODUCTION

Eagle Environmental, Inc. (Eagle) has completed the initial phase of Polychlorinated Biphenyl (PCB) investigation at the John C. Clark Elementary School located at 75 Clark Street in Hartford, CT (Site). The PCB investigation was commissioned at the request of the Hartford Public Schools. The PCB Investigation was performed in response to the identification of PCB-containing building materials during pre-renovation testing at the Site.

This investigation summary is intended to provide the Client with information related to PCB's in building materials, dust and air at the John C. Clark Elementary School. The goal of the initial investigation was to develop data that will support future efforts to restore indoor air quality to acceptable limits. The initial investigation does not constitute a comprehensive sampling of all potential PCB-containing building materials at the Site.

SITE DESCRIPTION

The John C. Clark Elementary School is a two-story institutional building that was constructed in 1971. The building currently services pre-K aged children through grade eight. The approximately 104,000 square foot building consists of steel structural framing with masonry walls and poured concrete floors. The steel structure is insulated with non-asbestos spray applied fire proofing throughout. Interior partition walls are primarily gypsum board. Ceiling systems consist of suspended acoustical tiles in an aluminum grid system. The windows are aluminum with fixed Lexan panels in metal frames. The roofs are flat and consist of built up asphalt roofing systems with gravel ballast.

The building is heated and cooled by eleven (11) Air Handling Units (AHU's) located in six (6) distinct mechanical rooms. The mechanical rooms are located on the upper level of the building with the exception of one (1) mechanical room, which is located in the penthouse and serves the gymnasium. The mechanical duct work consists of galvanized metal and is insulated on the exterior of the ducts with fiberglass insulation. The eleven (11) AHU's service approximately thirty-one (31) zones within the building. The auditorium and gymnasium contain ducted returns while the remainder of the building consists of primarily plenum air returns.

BACKGROUND

The initial PCB sampling was performed in anticipation of a planned renovation project within the building, which will include the installation of a fire protection system. The fire protection system project is anticipated to be performed with partial reimbursement through the State of Connecticut Department of Education. The State of Connecticut Department of Education Office of School Facilities (OSF) requires testing for various environmental constituents as part of their reimbursement program. Polychlorinated Biphenyls (PCB's) are one of the environmental constituents, which require evaluation. OSF requires only those building materials that will be impacted by the renovation work to be tested.

A total of twelve (12) paint samples were collected for PCB analysis since the paint would be impacted during the fire protection renovation project. Analysis of the paint samples yielded results of PCB's between 12 parts per million (PPM) and 100 PPM. PCB's are federally regulated when concentrations equal or exceed 50 PPM. PCB's at concentrations less than 50 PPM is regulated on the State level by the State of Connecticut Department of Energy and Environmental Protection (DEEP).

In consultation with the USEPA, air sampling was commissioned by the City of Hartford Public Schools to evaluate the indoor air at the Site for PCB's. Three (3) air samples were collected to evaluate indoor air at the site for PCB levels. The three (3) air samples yielded results, which were below the prudent public health level established by USEPA for children >6 years old but exceeded the level for children <6 years old. Upon receipt of the air sample results, the Hartford Public Schools elected to voluntarily remove students from the school for further evaluation.

GENERAL INFORMATION ON PCB'S (Source USEPA Fact Sheet)

PCBs belong to a broad family of man-made organic chemicals known as chlorinated hydrocarbons. PCBs were domestically manufactured from 1929 until their manufacture was banned in 1979. They have a range of toxicity and vary in consistency from thin, light-colored liquids to yellow or black waxy solids. Due to their non-flammability, chemical stability, high boiling point, and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including electrical, heat transfer, and hydraulic equipment; as plasticizers in paints, plastics, and rubber products; in pigments, dyes, and carbonless copy paper; and many other industrial applications.

PCB EVALUATION

The PCB investigation at the Site was performed to evaluate building materials (bulk materials), air and dust for PCB's. The investigation was not intended to sample every building material that may contain PCB's, but rather to focus on potential primary sources of PCB's and secondary sources (Sinks) of PCB's, which may be affecting the indoor air quality at the Site. Furthermore, the goal of the investigation was to develop data that would support future efforts in the building that would re-establish indoor air quality to acceptable limits. Tasks performed during the investigation included the following:

- Visual inspection of the building to locate and sample potential primary and secondary sources of PCB's that may have an effect on the indoor air quality.
- Perform dust sampling to evaluate the presence of PCB's in settled dust
- Perform air sampling to evaluate the presence of PCB's in indoor air
- Perform an analysis of the indoor air system in respect to PCB contamination
- Perform a review of past activities within the building that may have contributed to PCB indoor air levels

VISUAL INSPECTION OF BUILDING

A visual inspection of the building was performed to identify potential primary and secondary sources of PCB's in building materials. The inspection was limited to visually accessible building materials. Caulk installed prior to the PCB ban in 1978 is a building material that may contain PCB's. The visual inspection identified suspect PCB-containing caulk at the window frames at the metal frame/brick junction of each window opening. The caulk is present on both the interior and exterior portion of the window frames. The appearance of the caulk is grey/brown. Suspect PCB-containing caulk was also identified at the metal entrance door systems at the primary and secondary entrances to the building. The caulk is present at the metal frame/masonry junction. The appearance of the caulk is grey/brown. Suspect PCB-containing caulk was visually identified at the interior steel columns at the column/masonry junctions. The same caulk appears to be present on the exterior of the building at the masonry expansion joints. The appearance of the caulk is grey/brown. Suspect PCB-containing caulk was identified at the fresh air intake associated with the AHU for the gymnasium. The caulk is present on both the interior and exterior sides of the intake at the metal intake frame/masonry junction. The appearance of the caulk is grey/brown.

On January 19, 2015, four (4) samples of the window frame caulk, one (1) sample of the column caulk and one (1) sample of the door frame caulk were collected for analysis. A duplicate sample of the door frame caulk was collected for quality control purposes. The results of the caulk analysis are as follows:

- Sample 1-19-WC-01 (Room 101): 84,000 PPM (Aroclor 1254)
- Sample 1-19-WC-02 (Room 144): 76,000 PPM (Aroclor 1254)
- Sample 1-19-WC-03 (Principal' Office): 41,000 PPM (Aroclor 1254)
- Sample 1-19-WC-04 (Room 233): 97,000 PPM (Aroclor 1254)
- Sample 1-19-DC-05 (Entrance Vestibule): 79,000 PPM (Aroclor 1254)
- Sample 1-19-CC-06 (Upper Level Main Corridor): 65,000 PPM (Aroclor 1254)
- Sample 1-19-DUP-DC-07 (Entrance Vestibule): 71,000 PPM (Aroclor 1254)

The sample results of the window frame caulk represent exposures on the north, south and east elevations of the building.

One (1) sample of the caulk was collected from the fresh air intake associated with the gymnasium on January 8, 2015. The result of the caulk analysis is as follows:

- Sample 1-8-Caulk (Exterior Gymnasium Air Intake): 31,000 PPM (Aroclor 1254)

Each type of caulk sampled was found to contain PCB's above the federal regulatory level of 50 PPM.

The fresh air intakes associated with the remaining AHU's are vertical roof top units with painted plastic/fiberglass covers. The paint associated with the roof top units was sampled on January 8, 2015. The analysis result associated with the paint from the vertical air intake covers is as follows:

- Sample 1-8-Paint (Exterior Vertical Roof Air Intake Cover): 6.0 PPM (Aroclor 1254)

The visual inspection identified spray applied fire proofing on the steel structural members throughout the building. Spray applied fire proofing is a suspect PCB-containing material and can be a primary and/or secondary source (Sink) of PCB's. The spray applied fire proofing is located in the ceiling plenum, which serves as the return air system for the Heating, Ventilation and Air Conditioning (HVAC) system. Because of the way the air filtration system is established a portion of the return air comes into contact with the spray applied fireproofing on its way

back to the AHU's before it is mixed in the AHU with fresh air and redistributed throughout the building.

Sampling of the spray applied fire proofing was performed over the course of two (2) sampling periods. The initial sampling included the collection of fourteen (14) samples of the spray applied fire proofing; seven (7) samples were collected from each level of the building. The results of the spray applied fire proofing PCB analysis are as follows:

- Sample 1-14-I-01 (Room 100): 14 PPM (*)
- Sample 1-14-I-02 (Room 103): 12 PPM (*)
- Sample 1-14-I-03 (Room 114): 9.2 PPM (*)
- Sample 1-14-I-04 (Room 132 – Cafeteria): 9.0 PPM (*)
- Sample 1-14-I-05 (Room 136): 18 PPM (Aroclor 1254)
- Sample 1-14-I-06 (Room 144): 10 PPM (*)
- Sample 1-14-I-07 (First Floor Corridor): 7.2 PPM (*)
- Sample 1-14-I-08 (Room 204): 16 PPM (*)
- Sample 1-14-I-09 (Room 208): 7.3 PPM (*)
- Sample 1-14-I-10 (Room 220): 4.0 PPM (*)
- Sample 1-14-I-11 (Second Floor Corridor): 3.8 PPM (*)
- Sample 1-14-I-12 (Room 232): 13 PPM (*)
- Sample 1-14-I-13 (Room 218): 10 PPM (*)
- Sample 1-14-I-14 (Lobby): 6.1 PPM (*)

(*)= Laboratory reported total PCB concentration but could not decipher between Aroclor 1248 and 1254.

The results of the initial round of testing on the spray applied fire proofing yielded results between 4.0 PPM and 18 PPM. A second round of testing was conducted to evaluate a deeper portion of the spray applied fire proofing in the matrix. Due to visual presence of heavy dust loading the exposed fire proofing, a second set of samples was collected after removing the top "dust" layer. The sampling was performed in an attempt to determine if the fire proofing was contaminated from the dust or was a primary source of PCB's. Three (3) samples were co-arranged with initial sampling sites and were re-sampled after the "dust" layer was removed. One (1) additional sample was also collected from the mezzanine penthouse where dust heavy dust loading was not observed. The sample results are as follows:

- Sample 1-20-I-01 (Room 100): 11 PPM (*) – Initial Result 14 PPM

- Sample 1-20-I-05 (Room 136): 12 PPM (Aroclor 1248) – Initial Result 18 PPM
- Sample 1-20-I-11 (Second Floor Corridor): 9.4 (*) – Initial Result 3.8 PPM
- Sample 1-20-I-15 (Mezzanine Mechanical Room): 23 PPM (Aroclor 1254)

(*)= Laboratory reported total PCB concentration but could not decipher between Aroclor 1248 and 1254.

Results showed concentrations of PCB's greater than 1 PPM but less than 50 PPM. Between the two (2) rounds of samplings, both Aroclor 1248 and 1254 were definitively identified suggesting that the spray applied fire proofing may be both a primary and second source of PCB's in the building.

Acoustical ceiling tiles are known to be both primary and second sources of PCB's in buildings. Eagle obtained information that the ceiling tiles were replaced during the summer recess of 2014. Testing of the ceiling tiles was performed to possibly rule ceiling tiles out as a primary source of PCB's. Fourteen (14) samples were collected on January 14, 2015; seven (7) from each level of the building. The analysis results of the acoustical ceiling tiles are as follows:

- Sample 1-14-CT-01 (Room 100): 1.2 PPM (Aroclor 1248)
- Sample 1-14-CT-02 (Room 103): 1.8 PPM (Aroclor 1248)
- Sample 1-14-CT-03 (Room 114): 1.1 PPM (Aroclor 1248)
- Sample 1-14-CT-04 (Room 132 – Cafeteria): ND
- Sample 1-14-CT-05 (Room 136): 0.6 PPM (Aroclor 1248)
- Sample 1-14-CT-06 (Room 144): ND
- Sample 1-14-CT-07 (First Floor Corridor): ND
- Sample 1-14-CT-08 (Room 204): 0.8 PPM (*)
- Sample 1-14-CT-09 (Room 208): ND
- Sample 1-14-CT-10 (Room 220): ND
- Sample 1-14-CT-11 (Second Floor Corridor): ND
- Sample 1-14-CT-12 (Room 232): 0.8 PPM (*)
- Sample 1-14-CT-13 (Room 218): ND
- Sample 1-14-CT-14 (Lobby): 0.6 PPM (Aroclor 1248)

(*)= Laboratory reported total PCB concentration but could not decipher between Aroclor 1248 and 1254.

ND = None Detected

DUST SAMPLING (Not Associated with the Air System)

Eagle performed dust sampling on various non-porous surfaces in limited high contact areas of the building to evaluate settled dust for PCB's. The dust sampling presented in this section is separate from that of the air system evaluation. An initial round of dust wipe sampling was performed on December 19, 2014 to evaluate limited high contact surfaces below the suspended ceiling system for PCB's. A total of ten (10) dust wipes were collected from various surfaces. The results of the dust wipe analysis are as follows:

- 12-19-W-01 (Room 118 on Cinderblock Wall): ND
- 12-19-W-02 (Room 132 on Cinderblock Wall): ND
- 12-19-W-03 (Room 143 on Counter Top): ND
- 12-19-W-04 (Room 100 on Counter Top): ND
- 12-19-W-05 (First Floor Corridor Floor): ND
- 12-19-W-06 (Room 200 Column): ND
- 12-19-W-07 (Stairwell on Cinderblock Wall): ND
- 12-19-W-08 (Room 233 on Sink Counter Top): ND
- 12-19-W-09 (Room 220 on Sink Cabinet): ND
- 12-19-W-10 (Second Floor Corridor Floor): ND

ND= None Detected

No PCB's were identified in the ten (10) samples collected from high contact areas below the acoustical ceiling system. The ten (10) samples collected on December 19, 2014 were the only set of dust samples collected below the acoustical ceiling system as part of this investigation.

AIR SAMPLING

Eagle performed an initial round of air sampling within the building on December 19, 2014 to evaluate the indoor air for PCB's. Three (3) samples were collected with one (1) sample collected on the upper level and two (2) samples collected on the lower level. The results of the air sample analysis are as follows:

- 12-19-A-01 (Upper Level Corridor between Room 211 and 201): 222 nanograms/m³
- 12-19-A-02 (Room 107 – Lower Cafeteria): 223 nanograms/m³
- 12-19-A-03 (Lower Level South Corridor): 194 nanograms/m³

All three (3) results exceeded the USEPA calculated prudent public health Level of 70 nanograms/m³ PCB's in Indoor School Air for children <3 years old. None of the samples, however, exceeded the USEPA calculated prudent public health level of 300 nanograms/m³ for children 6-12 years per age. In an effort to reduce the indoor air PCB concentrations, the building's ventilation system was adjusted to allow for increased fresh air intake at the AHU's. The air within the building was exchanged to the extent possible for several days prior to a second round of sampling being performed on January 5, 2015. Seven (7) air samples were collected with one (1) duplicate sample and one (1) blank for quality control purposes. The analytical results of the air sample analysis from January 5, 2015 are as follows:

- 1-5-AIR-01 (Lower Level Center Corridor): 571 nanograms/m³
- 1-5-AIR-02 (Room 100): 110 nanograms/m³
- 1-5-AIR-03 (Room 116): 140 nanograms/m³
- 1-5-AIR-04 (Room 132 Upper Cafeteria): 333 nanograms/m³
- 1-5-AIR -05 (Room 138): Broken Sample
- 1-5-AIR-06 (Room 204): 166 nanograms/m³
- 1-5-AIR-07 (Room 214): 262 nanograms/m³
- 1-5-AIR-08 (Room 219 – Gymnasium): 229 nanograms/m³
- 1-5-AIR-09 (Room 232): 166 nanograms/m³
- 1-5-AIR-B (Blank): ND
- 1-5-AIR-DUP (Duplicate Samples of 1-5-AIR-03): 140 nanograms/m³

All of the samples collected on January 5, 2015 exceeded the Public Health Level of 70 nanograms/m³ of PCB's in Indoor School Air for children <3 years old and two (2) samples exceeded the Public Health Level of 300 nanograms/m³ of PCB for children 6-<12 years old and one (1) sample exceeded the Public Health Level of 450 nanograms/m³ of PCB for children 12 - <15 years old.

AIR SYSTEM ANALYSIS

Eagle performed an analysis of the building's air handling system in respect to PCB contamination. The air handling system, if contaminated with PCB's, can be a primary factor in the overall indoor air quality within the building. The evaluation of the air handling system may be the single most important factor in solving indoor air quality issues related to PCB contamination. For the purpose of this evaluation, the air handling system consists of the air fresh air intakes, the Air Handling Units (AHU's), the supply air ducts including the main trunk lines and the branch lines, the return air ducts and the return air plenum. The analysis of the air handling system included the following:

- A review of existing Heating, Ventilation and Air Conditioning Plans
- Dust sampling within the ventilation system
- Bulk sampling of ventilation filters
- Air sampling of supply air

This evaluation did not include an evaluation of how well the system is balanced. Although this is an important factor to consider, information provided to Eagle indicated that the system was balanced, to the best of its ability, during the summer recess of 2014. Temperature readings collected throughout the building during different phases of the testing varied widely at times.

Eagle obtained a set of HVAC plans from the Hartford Public Schools, which identify the mechanical room locations, AHU locations and duct work schematics. The building contains six (6) mechanical rooms containing eleven (11) AHU's which provide heating and cooling to approximately thirty-one (31) separate zones. The duct work is galvanized sheet metal and insulated within fiberglass insulation on the exterior of the duct work. Most ducts are insulated but not all. The interior of the ductwork was found to be un-lined. The air return consists of a plenum return (space between suspended ceiling and ceiling deck) with the exception of the auditorium and gymnasium, which have ducted returns. There are however, short pieces of return air ducts between the plenum space and mechanical room walls on the upper level and through the floor between the mechanical room and lower level air plenums to allow for air flow out of the plenums and back into the supply stream.

The initial step of the evaluation included a review of the fresh air intakes which are located on the roof of the building. The fresh air intake for the air AHU's consist of vertical penetrations through the roof with the exception of the air intake for the gymnasium, which consists of a louvered vent in the penthouse roof wall. The vertical penetration intakes contain a plastic/fiberglass cover to prevent rain water from entering the system. The paint on the caps of the vertical intakes was tested and found to contain PCB's at 6 PPM. The caulk associated with the louver intake for the gymnasium was found to contain 31,000 PPM of PCB.

Bulk sampling of the AHU filters was performed on January 19, 2015. Bulk samples were collected from one (1) filter associated with each AHU. The sampled filter was placed in a sealed bag following sampling and was replaced with a new filter. Site sources indicated that last filter change was November 2014. A total of eleven (11) filters from eleven (11) separate AHU's were sampled. The results of the analysis of the AHU filters are as follows:

- 1-19-AHU-1 (AHU #1): 15 PPM (*)

- 1-19-AHU-2 (AHU #2): 14 PPM (*)
- 1-19-AHU-3 (AHU #3): 12 PPM (*)
- 1-19-AHU-4 (AHU #4): 18 PPM (*)
- 1-19-AHU-5 (AHU #5): 5.4 PPM (*)
- 1-19-AHU-6 (AHU #6): 31 PPM (*)
- 1-19-AHU-7 (AHU #7): 2.9 PPM (*)
- 1-19-AHU-8 (AHU #8): 43 PPM (*)
- 1-19-AHU-9 (AHU #9): ND
- 1-19-AHU-10 (AHU #10): 40 PPM (*)
- 1-19-AHU-11 (AHU #11): 35 PPM (*)
- 1-19-AHU-DUP (Duplicate sample of AHU #11): (4.3 PPM) (*)

(*)= Laboratory reported total PCB concentration but could not decipher between Aroclor 1248 and 1254.

ND = None Detected

All of the filters sampled, with the exception of the filter associated with AHU #9 contain PCB contamination between 2.9 PPM and 40 PPM. AHU #9 is associated with the auditorium and contains a ducted return.

Roofing debris including gravel and roof insulation were identified in three of the AHU mixing boxes.

Dust Sampling was performed within the ventilation system on January 19 and 20, 2015. Dust samples were collected from fourteen (14) main supply ducts, two return air ducts (between plenums and mechanical rooms) and at seventeen (17) branch line diffusers. Each branch line contains a ceiling, and occasionally a wall mounted, metal diffuser with a baffle. The diffusers are spring loaded and were removed to access the branch lines for dust sampling. Main supply ducts were sampled directly downstream of the AHU filter through access panels.

Sampling of the main supply duct identified PCB's at concentrations between 0 ug/100 cm² PPM (none detected/1 sample) and 4.9 ug/100 cm². The average concentration of PCB's identified in the main supply line was 1.95 ug/100 cm².

Sampling of the branch lines at the diffusers identified PCB's at concentrations between 0 ug/100 cm² (none detected/3 samples) and 8.2 ug/100 cm². The average concentration of PCB's in the branch lines at the diffusers was 3.35 ug/100 cm².

Sampling of the return air ducts ranged from 1.5 ug/100 cm² to 4.3 ug/100 cm². The average concentration of PCB's in the return air ducts was 2.9 ug/100 cm². However, only limited sampling of the return air ducts was performed due to limited accessibility.

Dust sampling within the return air plenum was performed on January 14, 2015. Fourteen (14) dust samples were collected from above the suspended ceiling from various non-porous surfaces including the corrugated metal ceiling deck, conduit, top of duct work and metal pipe hanger rollers. From the fourteen (14) samples collected, six (6) were none detected and the remaining samples ranged from 1.6 PPM to 5.4 PPM. In all cases where PCB's were detected on these samples, the laboratory could not decipher between Aroclor 1248 and Aroclor 1254 and the total PCB concentration was reported.

Air sampling was performed in two (2) locations directly at the diffusers output. The samples were collected directly under the diffusers and with six (6) inches of the diffuser to evaluate the PCB air concentrations within the supply air. Air samples were collected in the same room and within twelve (12) feet of the air sample at the diffuser to determine if a variance exists. The results of the air sample analysis are as follows:

- 1-19-AIR-01 (Lower level corridor): 156 nanograms/m³
- 1-19-AIR-02 (Lower level corridor 12 feet north of sample 01): 172 nanograms/m³
- 1-19-AIR-03 (Room 214 center): 146 nanograms/m³
- 1-19-AIR-04 (Room 214 at door): 148 nanograms/m³

The results show that very little variance exists between the quality of the supply air and the air within twelve (12) feet of the output air sample.

REVIEW OF PAST ACTIVITIES WITHIN THE BUILDING

Information provided to Eagle confirmed that limited renovation and asbestos-abatement work was performed during the summer recess of 2014. It is our understanding that the following activities were performed:

- Asbestos abatement of approximately 12,000 square feet of asbestos-containing floor tile and mastic
- Asbestos abatement of approximately 350 square feet of window glazing compound
- Priming and painting of the classroom and hallway walls
- Replacement of base cove molding
- Removal of spiral staircases and infilling of former door opening to staircases

- Replacement of the existing acoustical ceiling tiles and painting of the ceiling grid
- Resilient flooring was washed and waxed
- Demolition of exterior front wall beside the ramp
- Balancing of the HVAC System
- Replacement of window glazing
- Replacement of drywall in the lower level of the building where water impact had occurred
- Existing fixtures were re-lamped. Non-working ballasts were replaced
- Installation of smart boards in the classrooms
- Installation of new security desk in lobby
- Exterior work

The work of this project was managed by the Capital Region Education Council (CREC). Work was performed during the summer recess of 2014. The asbestos abatement work associated with the floor tile and mastic removal was performed RAMCO Environmental, Inc. (CT License #000018) of Hartford, CT. The asbestos abatement work associated with the asbestos glazing removal was performed by Abatement Industries Group (CT License #000026). The asbestos abatement project monitoring was performed by HRP Associates of Farmington, CT.

The general renovation work was performed by Bartlett Brainard Eacott (BB&E) and was designed by Tecton Architects.

Asbestos abatement activities were performed utilizing full containment negative pressure enclosures for the floor tile and mastic removal activities. The window glazing was removed to the exterior of the building with the interior of the building isolated with a polyethylene critical barrier over the window opening. Photo documentation provided by CREC confirms these measures.

As reported to Eagle, painting activities did not include sanding of any surfaces. Primers were applied by rolling and or spraying and top coating was performed following a 24-hour drying period of the primer. Base cove molding was removed utilizing a putty knife and new molding was applied new adhesive.

Water impacted gypsum board was removed by scoring the gypsum board at the cut point followed by manual removal. The impacted gypsum board was found to be harboring mold. Removal of the gypsum board was performed to a height of 2-feet above the floor level. Gypsum board above the 2-foot level was not impacted and did not warrant removal.

No additional information was providing regarding the processes utilized for performing the remaining work.

INVESTIGATION SUMMARY

The initial testing for PCB's at the John C. Clark School was performed in accordance with the State of Connecticut Department of Education OSF requirements for a project seeking State reimbursement. The identification of PCB's in certain paint above the federally regulated level prompted the Hartford Public Schools to perform further evaluations in the building related to PCB's. Air sampling performed on December 19, 2014 identified PCB indoor air concentrations, which exceeded the USEPA calculated prudent public health Level for the youngest occupants in the building. Air sampling performed on January 5, 2015 identified PCB indoor air concentrations, which exceeded the calculated prudent public health Levels for three (3) age groups in the building. Dust sampling performed on December 19, 2014 in high contact areas below the acoustical ceiling system did not detect PCB's at the sampled locations. On January 6, 2014, the Hartford Public Schools elected not to re-open the School after the holiday break until further investigations could be performed.

On January 15, 2015, representatives from the Hartford Public Schools, Arcadis/O&G, CREC, Eagle Environmental, Inc. and JM Environmental, Inc. met at the School to discuss the next steps moving forward and to exchange information related to the renovation work that was performed during the 2014 summer recess. Following the meeting, Eagle and JM Environmental performed a walkthrough of the building and developed an evaluation strategy to further assess the building for PCB's. The overall evaluation was performed by Eagle between December 19, 2014 and January 20, 2015. This does not include the initial pre-renovation testing.

RESULTS OF INVESTIGATION

The visual inspection identified several building materials that may be primary or secondary sources (Sinks) of PCB's. Bulk sampling of caulk at window and door systems, interior columns and the intake louver vent associated with the gymnasium air intake was found to contain PCB concentrations ranging from 31,000 PPM to 97,000 PPM and may be attributing to the indoor air quality at the school. The potential exists that the PCB's from the caulk have leached into the adjacent masonry substrates and the substrates will require evaluation. The Aroclor associated with the caulk is 1254.

The twelve paint samples contained varying levels of PCB's ranging from 12PPM to 100 PPM. Aroclor 1248 was identified in the paint. It is unclear at this point how the paint is affecting the indoor air quality within the building.

The spray applied fire proofing on the structural steel in the return plenum throughout the building was identified as containing PCB's at levels between 4.0 PPM and 23 PPM. Aroclor 1254 was definitively identified in two (2) of the samples and the PCB Aroclor 1248 was definitively identified in one (1) sample. The results of the remaining samples could not be differentiated between Aroclor 1248 and Aroclor 1254. The spray applied fire proofing is potentially a primary and secondary source of PCB's in the building. PCB contamination associated with the AHU filters and dust within the supply duct work, return duct work and in the ceiling plenum support this theory.

Paint associated with the covers of the vertical fresh air intakes was found to contain Aroclor 1254 at concentrations of 6.0 PPM.

Seven (7) of fourteen (14) samples of the replacement ceiling tiles identified detections of PCB's with three (3) samples containing PCB concentrations exceeding 1 PPM. The Aroclor associated with the ceiling tiles is 1248 in most cases. In limited cases the laboratory could not decipher between Aroclor 1248 and Aroclor 1254. The ceiling tiles have been in place for less than six (6) and it is our opinion that the ceiling tiles are becoming contaminated by the return air which comes into contact with the back side of the ceiling tiles. The locations of the ceiling tiles with PCB contamination were widely distributed throughout the building and the contamination correlates well with the return air.

Ten (10) dust wipe samples collected from high contact areas were all none detected for PCB's. The occupied areas of the building are well maintained and routine cleaning of the building in conjunction with the cleaning performed over the summer are activities that are likely to reduce PCB in dust concentrations.

The analysis of the air system identified several factors that are likely contributing to the current indoor air quality in the building. The presence of the PCB contaminated spray applied fire proofing in the return air plenum is likely a significant factor in the current indoor air quality. It is uncertain if the spray applied fire proofing is a primary or second source of PCB's based on both Aroclor 1248 (associated with the paint) and Aroclor 1254 (associated with the caulk) being identified in the fire proofing material. Dust sampling within the air plenum on non-porous surfaces identified PCB contamination at varying levels confirming the presence of PCB dust in the return air plenum.

Sampling of the AHU filters identified PCB contamination ranging from none detected (1 sample) to 40 PPM. This indicates that the return air that is being redistributed throughout the building is contaminated with PCB's before it re-enters the air system. Supply air ducts downstream of the AHU filter contain an average PCB concentration of 1.95 PPM and the average concentration of PCB's in the branch line at the diffusers is 3.35 PPM. Dust sampling within the AHU's and duct system confirm the presence of PCB contamination at varying levels. Replacement of the AHU filters and mitigation of the dust from throughout the air handling system will be a critical in improving the indoor air quality within the building.

The air sampling results in the building fluctuated throughout the sampling periods. The elevated results obtained from the January 15, 2015 sampling may be a result of the increase air flow through the system during the flushing process. The airborne PCB levels decreased during the most recent round of sampling and there was not a significant variance between the samples collected directly under the supply air diffusers and the samples collected within the same area but not directly under the diffusers.

It is our understanding that CREC performed renovation work during the summer of 2014 that likely impacted PCB-containing and PCB-contaminated materials based on the scope of renovation and abatement work provided to Eagle. The paint on the gypsum walls is known to contain PCB's between concentrations of 12 PPM and 100 PPM (based on existing sampling data). It is our understanding that no sanding, which could have created PCB-contaminated dust, was performed during the repainting process.

Removal of the gypsum wall board and replacement of the acoustical ceiling tiles likely disturbed PCB-contaminated materials but the affect this may have had on the indoor air quality within the building cannot be determined. This investigation has confirmed that PCB contamination is present on new ceiling tiles that were installed less than six months ago.

The window replacement included the replacement of the Lexan window panels which disturbed glazing compound, which held the original panels in place. The window glazing compound was not tested for PCB's and it cannot be determined if the replacement of the glazing had an effect on the indoor air quality within the building. The Abatement Contractor's State of Connecticut Notice of Asbestos Abatement indicates that 350 square feet of "caulk" was removed. It is likely that the contractor referenced "caulk" rather than glazing compound on their notification. Additionally, no signs of caulk removal were identified around the windows or doors. However, this should be clarified by the abatement contractor.

In summary, the renovation work performed over the course of the 2014 summer recess may have impacted certain building materials which contain, or were contaminated by, PCB's. The pre-existing conditions in regards to PCB contamination within the building were unknown at the time of the renovation work and the affect that the renovation work may have had on the overall PCB indoor air levels cannot be determined. Furthermore, the building was cleaned following the renovation work making it difficult to correlate the renovation work with PCB contamination in the building.